

RECLAMATION

Managing Water in the West

Environmental Assessment

Central California Irrigation District Amara System Improvements Project

Bay Delta Restoration Grant



**U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Regional Office
Sacramento, CA**

October 2014

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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Section 1 Introduction

This Environmental Assessment (EA) has been prepared by the Bureau of Reclamation (Reclamation) to examine the potential direct, indirect, and cumulative environmental impacts associated with providing federal grant funding to Central California Irrigation District (CCID) for their Amaral System Improvements Project (Proposed Project).

The Proposed Project, located in Stanislaus County, California, outside the City of Newman (Figure 1), would allow for the capture of agricultural spill and tailwater prior to discharging into the San Joaquin River and pump them into a regulating reservoir where they can be reincorporated back into CCID's irrigation system.

1.1 Need for the Proposal

The existing Amaral System is comprised of a buried pipeline terminating into an unlined ditch that ultimately discharges into the San Joaquin River. While the existing system provides irrigation deliveries to some adjacent growers, other growers discharge their surface runoff (tailwater) back into the Amaral System, causing wide fluctuations in flow rates ultimately resulting in uncontrolled discharges to the San Joaquin River. Additionally, the steep ground conditions and highly erodible soil conditions cause silt and other pollutants to be carried off with the tailwater, impacting the water quality of the San Joaquin River. The Proposed Project would capture agricultural spill and tailwater prior to their discharge to the river and pump them into a regulating reservoir where they can be reincorporated back into the irrigation system. The existing system results in operational spill and uncontrollable drainage discharges estimated at 487 acre-feet per year (AFY); the Proposed Project would completely eliminate these operational spills currently discharged to the San Joaquin River.

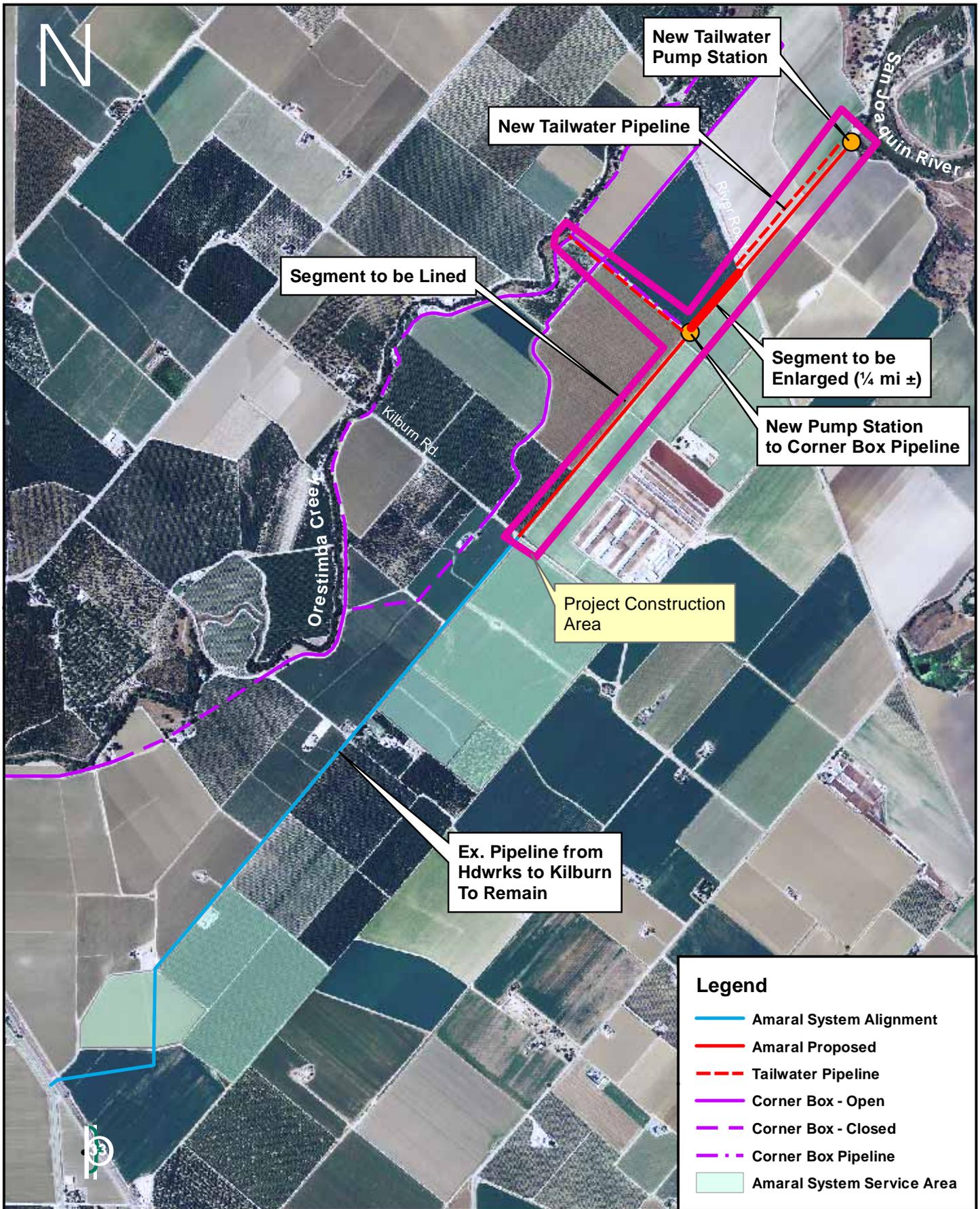
Section 2 Proposed Action and Alternatives

2.1 No Action Alternative

Under the No Action Alternative, Reclamation would not award the grant and CCID would continue to operate and maintain their irrigation system under existing conditions.

2.2 Proposed Action Alternative

Reclamation proposes to award CCID with federal Bay Delta Restoration grant funding for a portion of the Proposed Project. The goal of the Proposed Project is to address the major deficiencies of the existing system and provide a new facility with the capacity, control and reliability necessary to eliminate operational spills and to encourage growers to install high-efficiency irrigation systems.



**Central California Irrigation District
Amaral System Spill Elimination Project**

Figure 1

The Proposed Project will:

- Replace the portion of the Amaral System downstream from Kilburn Road (approximately one mile of unlined ditch) with a combination of a new linear reservoir and concrete-lined ditch or pipeline. The reservoir would remain within the same alignment as the existing unlined ditch but would be wider with raised banks to provide a larger volume for storage. The reservoir would be approximately 0.25 miles long and approximately 60 to 80 feet wide at the top. Estimated capacity is 7.5 to 10 AF. Approximately 0.8 miles of open ditch would be replaced with either a 30-inch pipeline or concrete-lined canal.
- Construct a small pump station near the end of the Amaral System to capture tailwater and operational spills from the system. The pump station would pump this water upslope approximately 0.6 miles through a new 24-inch PVC pipeline.
- Construct a small pump station to lift water from the proposed reservoir into an existing pipeline connected to CCID's corner box irrigation system. This connection would improve delivery flexibility by creating interconnectivity between these two adjacent systems.
- Tailwater flows upstream of the proposed reservoir would be routed to the reservoir using existing ditches.
- Pump stations would be integrated with CCID's SCADA system where appropriate.

See Appendix A for construction design drawings of the Proposed Project.

Construction Activities will include:

- All pipelines, regardless of diameter, would be installed with 36 inches of cover over the pipe, creating a total trench depth of 36 inches plus the outside pipe diameter. The trench would be cut with an excavator or trencher as appropriate. Spoil would be placed beside the trench while the pipe joints are installed with a second excavator. After pipe joint placement, sand or pea gravel would be placed in the trench to the spring-line of the pipe, after which, the spoiled native material would be pushed back into the trench in lifts and compacted. Any excess spoil would be graded into the road. Fugitive dust would be controlled through watering and other typical methods.
- The portion of the existing ditch converted to the reservoir would be cleaned of organic material and debris. Excavators would remove existing embankment at the sides of the existing ditch and replace and compact the material to form the new reservoir levees. Excavated material is estimated to be approximately 8,500 cubic yards. Fugitive dust would be controlled through watering and other typical methods.
- Pump stations would consist of a pre-cast concrete sump structure, one to two pump units and a manifold to connect the pumps to the pipeline. An excavator would excavate the hole for the sump that would be placed by that same excavator or by crane (depending on the final weight). The pump units would be installed with a boom truck and the manifold would be installed with hand labor, including pipe layers and welders.

Environmental Protection Measures and Commitments will include:

As part of the Proposed Project, the following environmental protection measures and commitments would be implemented by CCID to avoid, minimize, and/or reduce potential environmental impacts associated with the Proposed Project:

- Dust Control Measures:
 - All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, would be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, or covered with a tarp or other suitable cover or vegetative ground cover.
 - All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities would be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.
 - When materials are transported offsite, all material would be covered or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container would be maintained.
 - Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, the piles would be effectively stabilized of fugitive dust emissions utilizing sufficient water stabilizer/suppressant.

- Construction-related activities will occur outside of the nesting season to the extent possible. If construction activities cannot avoid the nesting season, pre-construction surveys for raptors will be conducted for the presence of occupied nests. In coordination with CDFW, an appropriate construction-free buffer zone will be observed around each nest until a biologist has determined that chicks have fledged. With environmental protection measures and commitments in place, potential impacts to Swainson’s hawk and other raptors protected by the MBTA will be avoided and/or minimized.

Section 3 Affected Environment and Environmental Consequences

Potential impacts to the following resources were considered and found to be minor. Brief explanations for the impacts are provided below:

- Indian Sacred Sites: The Proposed Project is not on federal lands, and would not affect and/or prohibit access to and ceremonial use of Indian sacred sites.

- Indian Trust Assets (ITA): The nearest ITA is the Chicken Ranch Rancheria, approximately 47 miles northeast of the project location. The Proposed Project does not have the potential to affect ITA.

- Environmental Justice: There are no economically disadvantaged or minority populations that would be disproportionately affected by the Proposed Project.

3.1 Biological Resources

The Proposed Project area is the footprint of the proposed earthmoving activities for the new reservoir and concrete lined-ditch or pipeline, and a 250-foot buffer around those activities in which noise and dust could occur. The present land use around the action area consists of agricultural fields and orchards, limited residential and commercial areas, farm roads and shoulders, and existing ditches and canal infrastructure. The Proposed Project area has been heavily cultivated and managed for decades, and herbicides are routinely used to control unwanted vegetation.

A species list was generated from the USFWS Sacramento Fish and Wildlife Office website (February 11, 2014). A California Natural Diversity Database (CNDDDB) was also queried for records of protected species within the vicinity of the action area (September 2014). The information collected, along with other Reclamation files, was analyzed to determine the likelihood of potential impacts to protected species (see list below). Reclamation considered these species and has determined that the Proposed Project would have no effect on them based on this analysis.

- Vernal pool fairy shrimp (*Branchinecta lynchi*)
- Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)
- Vernal pool tadpole shrimp (*Lepidurus packardi*)
- Green sturgeon (*Acipenser medirostris*)
- Delta smelt (*Hypomesus transpacificus*)
- Central Valley steelhead (*Oncorhynchus mykiss*)
- Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*)
- Winter-run Chinook salmon, Sacramento River (*Oncorhynchus tshawytscha*)
- California tiger salamander (*Ambystoma californiense*)
- California red-legged frog (*Rana draytonii*)
- Blunt-nosed leopard lizard (*Gambelia sila*)
- Giant garter snake (*Thamnophis gigas*)
- Fresno kangaroo rat (*Dipodomys nitratooides exilis*)
- San Joaquin kit fox (*Vulpes macrotis mutica*)

Environmental Consequences

No Action Alternative

Under the No Action Alternative, biological resources, including special-status species, would remain unchanged in the area.

Proposed Action Alternative

Based on land use patterns in the Proposed Project area and review of the CNDDDB occurrence records, no federally listed special-status species are expected to occur in the area or impacted by project activities. Swainson's hawk (*Buteo swainsonii*) could occur within the Proposed Project Area and are protected under the Migratory Bird Treaty Act (MBTA). Swainson's hawks are known to nest within the vicinity of the action area, which also contains suitable foraging habitat. There is also potential for other raptors protected by the MBTA to nest in trees within the action area, mostly within the residential/commercial areas. Construction-related activities will occur outside of the nesting season to the extent possible. If construction activities cannot avoid the nesting season, pre-construction surveys for raptors will be conducted for the presence of occupied nests. In coordination with CDFW, an appropriate construction-free buffer zone will be observed around each nest until a biologist has determined that chicks have fledged. With environmental protection measures and commitments in place, potential impacts to Swainson's hawk and other raptors protected by the MBTA will be avoided and/or minimized.

3.2 Water Resources

Amaral Ditch delivers an average of 1,870 AFY to approximately 690 acres. The Amaral system begins as a buried pipeline (2.5± miles) then converts to an open, unlined canal (1.6± miles), ultimately spilling into the San Joaquin River. The steep landscape and overall condition of the open channel of the Amaral system makes it difficult to control and results in operational spill and uncontrollable drainage discharges estimated at 487 AFY.

Because of the steep land condition and erodible nature of the soils, tailwater from this region is often high in suspended silt and can also carry pesticides. Spills from the Amaral system discharge directly into the San Joaquin River and may contribute to water quality degradation. The Proposed Project will eliminate discharges from this system. The system was constructed in the 1920s with portions piped in the 1950s. The upstream 2.5 miles of the Amaral system is a concrete pipeline. At the end of the pipeline, the system transitions to a small, unlined ditch. The system serves approximately 690 acres with major crops consisting of alfalfa, almonds, tomatoes, corn, and grains.

The served landscape is comprised of steep field with erodible soils. The Amaral system does not include any buffering or mid-stream storages which requires all growers to schedule their deliveries on a rotating basis, a condition that inhibits conversion to high-efficiency irrigation methods. Additionally, the steep nature of the fields cause irrigations to generate significant tailwater flows that are difficult to recapture and are eventually discharged to the San Joaquin River, along with associated silt and pesticides.

Although water quality data is not collected for tailwater discharges from the Amaral system, the Westside San Joaquin River Watershed Coalition (Westside Coalition) does collect water samples from the Marshall Road Drain (approximately three miles north of the Amaral System), which has consistently shown pesticide discharges. As cropping patterns and cultural practices within the Marshall Road Drain area are similar to the Amaral System, it is reasonable to assume the tailwater water quality is also similar.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the San Joaquin River would continue to receive runoff from Amaral Ditch, potentially impacting water quality within the river.

Proposed Action Alternative

The Proposed Project would construct an intermediate reservoir at the end of the existing pipeline and replace the 0.8 miles of the remaining open channel with a new pipeline. The new pipeline would operate as a closed, on-demand system that would completely eliminate operational spills. Additionally, the new reservoir would capture and reuse surface drain water (tailwater) generated by upslope irrigations. The new piped system would also improve delivery flexibility to the service area and encourage growers to convert to high efficiency irrigation systems. The small reservoir would virtually eliminate the operational spill and drain water discharged to the San Joaquin River by providing mid-stream storage.

The Proposed Project would conserve 487 AFY and result in 1,870 AFY of water better managed. CCID has contacted the growers within the service area and has received verbal commitments from growers operating 200 acres to install high-efficiency irrigation systems. These systems will dramatically reduce tailwater production and increase irrigation efficiency. The water conserved would reduce CCID's irrigation demand from the CVP, improve operational efficiency and decrease the amount of poor quality tailwater discharged into the San Joaquin River.

Over the past 15 years, CCID has implemented an aggressive water conservation program, including reservoir projects, canal lining projects and pipe conversion projects. These projects have conserved an estimated 35,000 AFY, which CCID has marketed to wildlife refuges and other water users, contributing to the regional water supply sustainability. Another benefit from the project will be the conversion from conventional irrigation methods to high-efficiency systems. Although CCID will not directly implement this conversion, the Proposed Project and access to funding assistance (through both NRCS and CCID funding programs) will encourage growers to install drip irrigation systems. Growers representing approximately 200 acres within the service area have indicated interest in improving their irrigation methods if the project were completed and funding assistance provided. Based on historic average application rates, the water savings from these systems could be as high as 1.4 AF per acre, amounting to more than 280 AFY should the entire 200 acre area convert to drip irrigation. In 2005, the Central Valley Regional Water Quality Control Board (CVRWQCB) established a Total Maximum Daily Load (TMDL) program for chlorpyrifos and diazinon pesticide discharges in the San Joaquin River. The primary goal of this program is to limit and eventually eliminate the discharge of those two pesticides to the San Joaquin River.

Water quality data collected since the beginning of the monitoring program show chronic water quality exceedances from the Marshall Road Drain which negatively impact water quality in the San Joaquin River. The Marshall Road Drain drains into the San Joaquin River just upstream of the Amaral Ditch system, and the water quality from both drains are estimated to be similar and have similar impacts on the San Joaquin River. Table 2 shows the count of water quality exceedances from the Marshall Road Drain since the beginning of the monitoring program and from 2010 to present.

Table 1: Marshall Road Drain Water Quality Exceedances

Constituent	Count Since Start of Monitoring	Count from 2010 to 2012
Water Flea Toxicity	3	1
Algae Toxicity	5	-
Ammonia	2	1
Arsenic	1	-
Boron	8	-
E. Coli	26	8
TDS	42	14
Chlorpyrifos*	18	6
DDE/DDT	19/7	8/3
Diazinon*	2	-
Dimethoate	3	-
Diuron	6	2
Gamma Chlordane	3	-
Malathion	3	3
Methyl-Parathion	1	-

* San Joaquin River TMDL constituent.

Elimination of tailwater discharges from the Amaral System service area are likely to reduce the number of measured exceedances in the San Joaquin River. The Westside Coalition will continue to monitor and report water quality in accordance with its monitoring program.

3.3 Cultural Resources

Cultural resources is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. The National Historic Preservation Act (NHPA) of 1966, as amended, is the primary Federal legislation that outlines the Federal Government’s responsibility to cultural resources. Section 106 of the NHPA requires the Federal Government to take into consideration the effects of an undertaking on cultural resources listed on or eligible for inclusion in the National Register of Historic Places (National Register). Those resources that are on or eligible for inclusion in the National Register are referred to as historic properties.

In an effort to identify historic properties, CCID contracted Applied EarthWorks, Incorporated to conduct a cultural resources survey to assist in the identification of historic properties (Lloyd et al. 2014). A records search and pedestrian survey identified one cultural resource within the APE: the Amaral Ditch. The Amaral Ditch is a 4.3 mile long lateral which originates at the CCID Main Canal and terminates on the west bank of the San Joaquin River. The Main Canal is a 71-mile long canal constructed between 1873 and 1880 by the San Joaquin and Kings River Canal Company (SJ&KRCC), to provide water to the west side of the valley (Lloyd et al. 2014:19). The Main Canal has continued operating to present day, and is currently part of the CCID water distribution system.

Lloyd et al. (2014) evaluated the Amaral Ditch as a lateral of the CCID Main Canal and determined it to be ineligible for listing on the National Register of Historic Places (NRHP). While Lloyd et al. (2014) does not specifically evaluate the Main Canal, for the purposes of this undertaking only, Reclamation is treating the Main Canal as eligible for inclusion in the NRHP under Criterion A, for local contributions to the history of early settlement, reclamation, and agriculture in Stanislaus County. Based on limited information, the Amaral Ditch appears to be constructed as a lateral to the Main Canal after 1940. The ditch functions to deliver water from the Main Canal and to receive drain water, which it conveys to the San Joaquin River. There is no evidence that the Amaral Ditch is significant either individually or as a contributing element of the Main Canal. Given that the proposed activities to modify the Amaral Ditch will not impact any portion of the Main Canal, the project will result in no historic properties affected pursuant to 36 CFR § 800.4(d)(1). Therefore, no historic properties would be affected as a result of implementing the Proposed Action.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, cultural resources would remain unchanged in the area.

Proposed Action Alternative

Utilizing these identification efforts, Reclamation entered into consultation with the California State Historic Preservation Officer (SHPO) on July 21, 2014, seeking their concurrence on a finding of “no historic properties affected pursuant to 36 CFR § 800.4(d)(1).” SHPO concurred with Reclamation’s findings and determination on September 9, 2014.

3.4 Air Quality

The Project area is located within the San Joaquin Valley Air Basin (SJVAB), which is regulated by the San Joaquin Valley Air Pollution Control District (SJVAPCD). The SJVAB has reached National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) for criteria pollutants of concern except for: ozone (O₃), inhalable particulate matter between 2.5 and 10 microns in diameter (PM₁₀), and particulate matter less than 2.5 microns in diameter (PM_{2.5}). As a result, the emissions of most concern are O₃ (which includes precursors such as volatile organic compounds [VOC] and nitrogen oxides [NO_x]), PM₁₀, and PM_{2.5}. Table 3-2 below shows the attainment status and *de minimis* threshold for general conformity for the criteria pollutants of most concern.

Table 2 SJVAB Attainment Status and <i>De Minimis</i> Thresholds for Federal Conformity Determinations		
Pollutant	Attainment Status ^a	(tons/year)
VOC (as ozone precursor)	Nonattainment ^d	10 ^b
NO _x (as an ozone precursor)	Nonattainment ^d	10 ^b
PM ₁₀	Nonattainment (CAAQS) Attainment (NAAQS)	15 ^c
PM _{2.5}	Nonattainment	100 15 ^c

^a Source: <http://www.arb.ca.gov/desig/adm/adm.htm>
^b 40 CFR 93.153 ^c SJVAPCD Threshold
^d The SJVAB is designated as Extreme for O₃ NAAQS

Construction emissions would vary from day to day and by activity, depending on the timing and intensity of construction, and wind speed and direction. Generally, air quality impacts from the Proposed Project would be localized in nature and decrease with distance. Ground disturbing activities would result in the temporary emissions of fugitive dust and vehicle combustion pollutants during the following activities:

- On-site earthwork (clearing, grading, excavation, compacting, and stockpiling)
- On-site construction equipment and haul truck engine emissions

Calculated emissions from the Proposed Project were estimated using the California Emissions Estimator Model for reactive organic gases (ROG)¹, NO_x, PM₁₀, and PM_{2.5}. Total project emissions are presented in Table 1 below.

¹ The term “volatile organic compounds” are synonymous with “reactive organic gases” for the purposes of this document since both terms refer to hydrocarbon compounds that contribute to ozone formation.

Table 3 Estimated Project Emissions ^a		
Pollutant	Unmitigated (tons/year)	Mitigated (tons/year)
ROG/VOC	0.1325	0.1325
NO _x	1.2432	1.2432
PM ₁₀	0.5646	0.4000
PM _{2.5}	0.1948	0.1337
Carbon dioxide equivalents	97.3877	98.3876
^a Source: CalEEMod Version 2011.1.1		

Environmental Consequences

No Action Alternative

Under the No Action Alternative, air quality would remain unchanged in the area.

Proposed Action Alternative

As shown in Table 1 above, the Proposed Project has been estimated to emit less than the *de minimis* threshold for NO_x and ROG/VOC as O₃ precursors and PM_{2.5}; therefore, a federal general conformity analysis report is not required. In addition, PM₁₀ emissions from the Proposed Project have been estimated to be well below the SJVAPCD threshold of 15 tons/year. Dust control measures (refer to Environmental Commitments in Section 2.2) would be implemented as part of the Proposed Project to suppress emissions of particulate matter. Furthermore, a Dust Control Plan approved by the SJVAPCD would be prepared by CCID to identify any additional measures to be implemented during construction activities to further minimize project-related emissions.

3.5 Cumulative Impacts

Greenhouse gas (GHG) impacts are considered to be cumulative impacts since any increase in GHG emissions would add to the existing inventory of gases that could contribute to climate change. The estimated GHG emission due to temporary Project construction activities is 97.3877 tons/year of carbon dioxide equivalents. On-going operations of the pumps would generate less GHG than construction activities to the point where no meaningful analysis should be performed. Since the amount of GHGs emitted from the Proposed Project is well below 25,000 metric tons/year, no report is required to be submitted to the U.S. Environmental Protection Agency (EPA) and California Air Resources Board.

There are no other known past, present, and reasonably foreseeable future actions that would cumulatively result in significant impacts to the human environment when taking into consideration the actions analyzed within this EA.

Section 4 Consultation and Coordination

4.1 Endangered Species Act (16 USC § 1531 et seq.)

Section 7 of the ESA requires Federal agencies, in consultation with the Secretary of the Interior, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species.

Reclamation has determined that the Proposed Project would have no effect on listed species.

4.2 National Historic Preservation Act (16 USC § 470 et seq.)

The NHPA of 1966, as amended (16 U.S.C. 470 et seq.), requires that federal agencies give the Advisory Council on Historic Preservation an opportunity to comment on the effects of an undertaking on historic properties, properties that are eligible for inclusion in the National Register. The 36 CFR Part 800 regulations implement Section 106 of the NHPA.

Section 106 of the NHPA requires federal agencies to consider the effects of federal undertakings on historic properties, properties determined eligible for inclusion in the National Register. Compliance with Section 106 follows a series of steps that are designed to identify interested parties, determine the APE, conduct cultural resource inventories, determine if historic properties are present within the APE, and assess effects on any identified historic properties. Reclamation consulted with the California SHPO on July 21, 2014, seeking their concurrence on a finding of “no historic properties affected pursuant to 36 CFR § 800.4(d)(1).” SHPO concurred with Reclamations’ findings and determination on September 9, 2014.

APPENDIX A
CONSTRUCTION DRAWINGS

CENTRAL CALIFORNIA IRRIGATION DISTRICT

LOS BANOS

CALIFORNIA

AMARAL SYSTEM IMPROVEMENT PROJECT LOCATION MAP

SUMMERS ENGINEERING INC.

Consulting Engineers
HANFORD CALIFORNIA

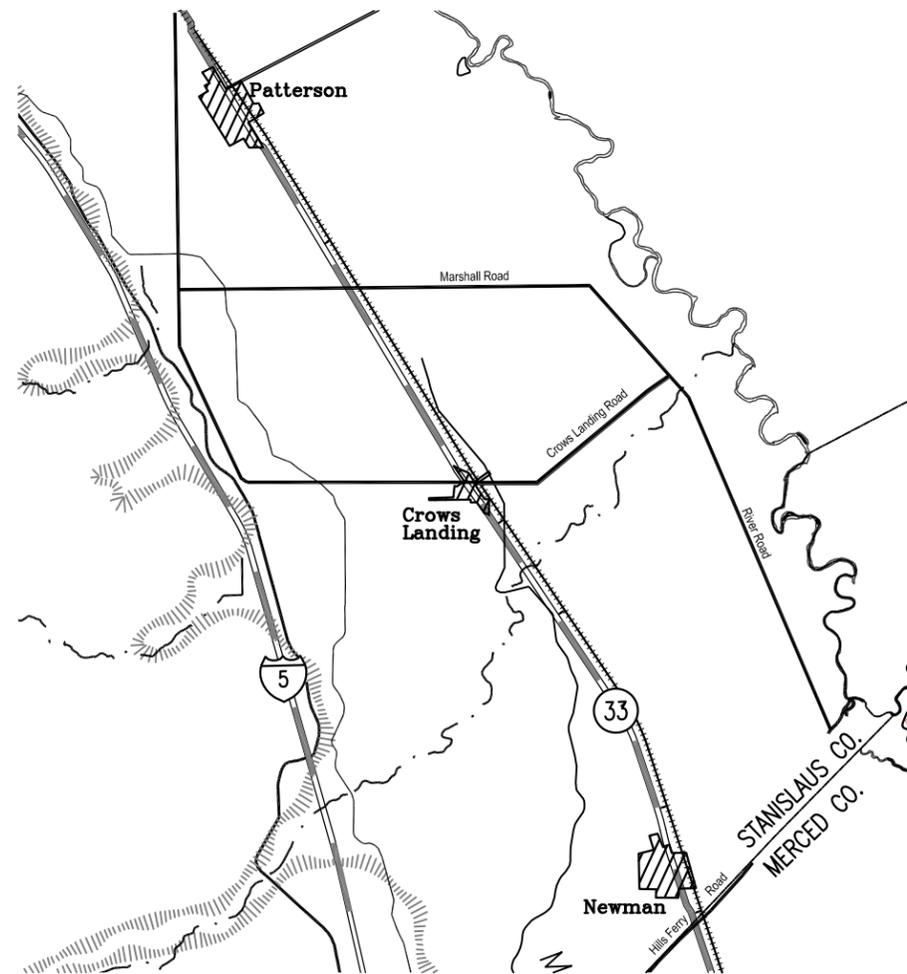
SEPTEMBER 2014

PRELIMINARY
For Review Only
Subject to Revision
MARCH 24, 2014

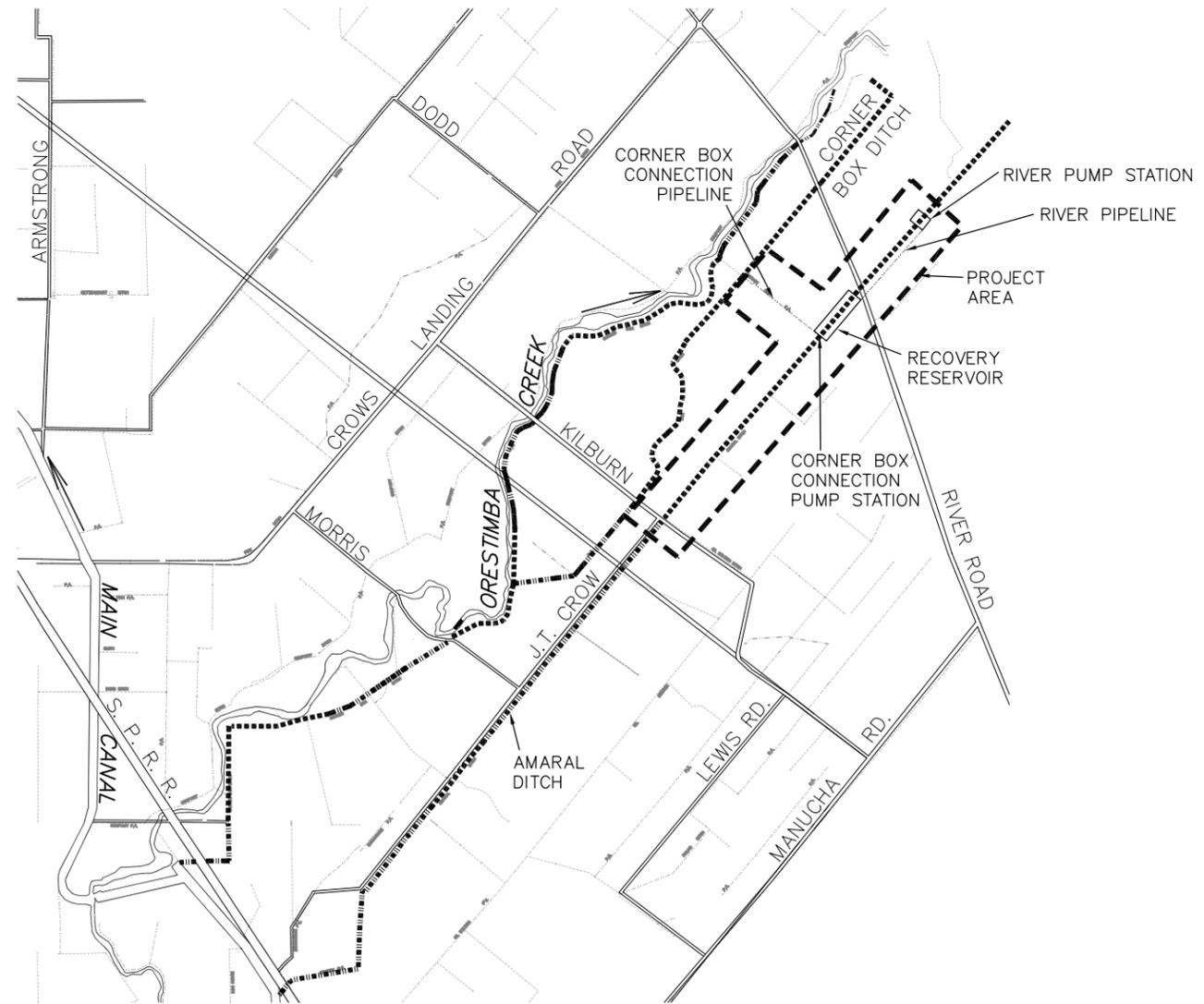
DRAWING LIST		
FIGURE NUMBER	TITLE	DRAWING NUMBER
1	LOCATION MAP	L-1
2	CANAL PLAN & PROFILE STA. 0+00 TO 25+00	PP-1
3	CANAL PLAN & PROFILE STA. 25+00 TO 50+00	PP-2
4	CANAL PLAN & PROFILE STA. 50+00 TO 58+40	PP-3
5	RIVER PIPELINE PLAN & PROFILE	PP-4
6	CORNER BOX CONNECTION PIPELINE PLAN & PROFILE	PP-5
7	RIVER PUMP STATION	RP-PS-1
8	CORNER BOX CONNECTION PUMP STATION DETAILS	CB-PS-1
9	CORNER BOX CONNECTION PIPELINE OUTLET STRUCTURE DETAILS	MD-1
10	RIVER ROAD CANAL CROSSING	CC-1



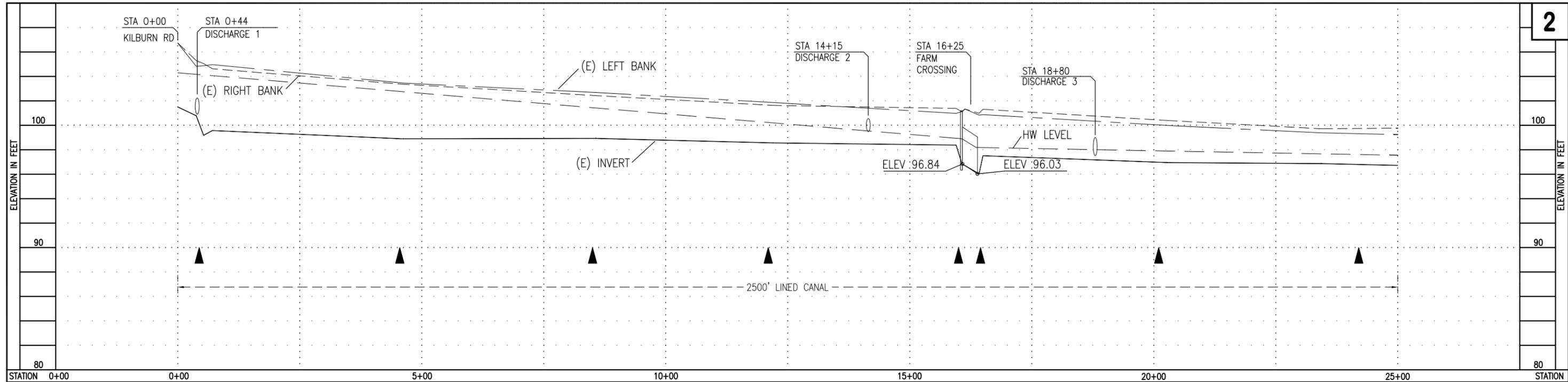
STATE OF CALIFORNIA



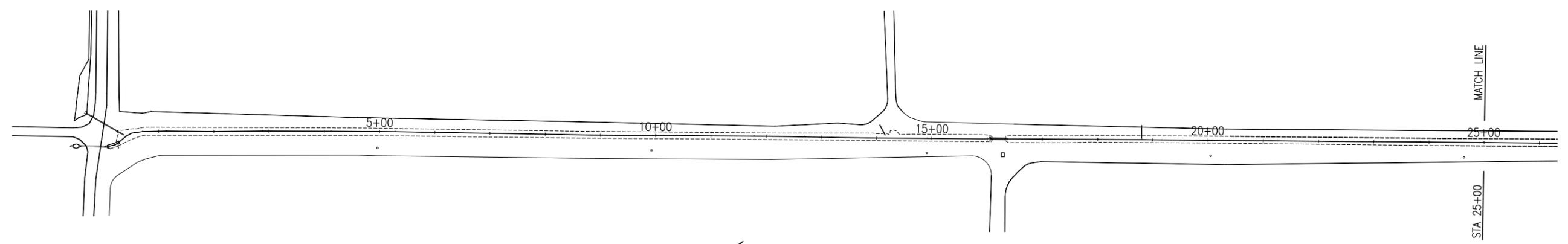
VICINITY MAP



AREA ENLARGEMENT



PROFILE



PLAN

DISCHARGE ELEV. DATA		
NO.	STA	FIELD ELEV.
1	0+44	100.79
2	14+15	99.97
3	18+80	99.92

GENERAL NOTES

- 1. xxxxxxxxxxxxxxxxxxxx
- 2. xxxxxxxxxxxxxxxxxxxx
- 3. xxxxxxxxxxxxxxxxxxxx
- 4. xxxxxxxxxxxxxxxxxxxx

EXPLANATION OF SYMBOLS

- ▲ CROSS SECTION LOCATION, SEE DRAWING NO. CS-1
- (E) EXISTING
- DWS DESIGN WATER SURFACE
- HW HIGH WATER

ESTIMATED QUANTITIES

EXCAVATION	xxxx CY
COMPACTED EMBANKMENT	xxxx CY

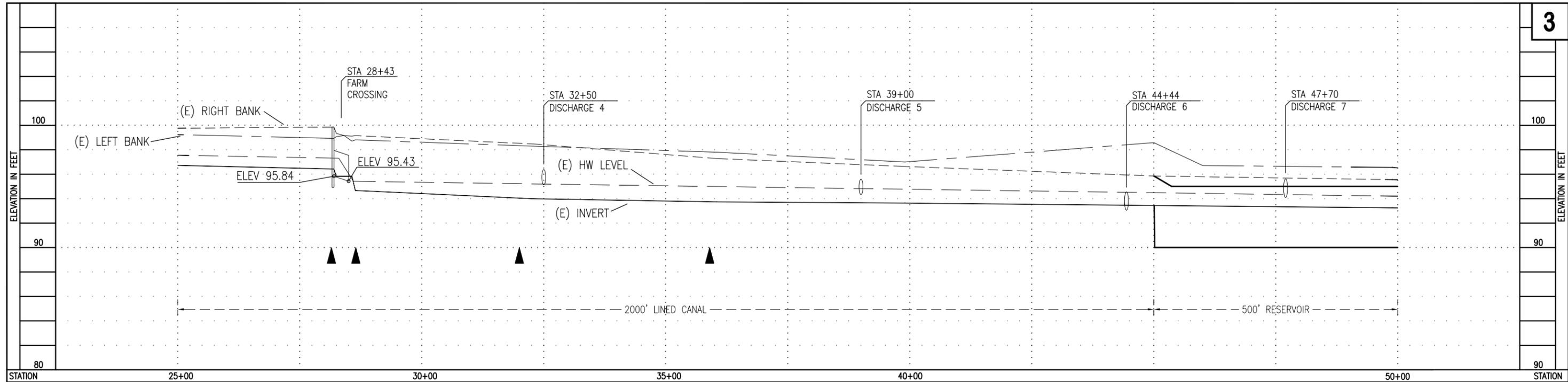
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Subject to Revision
SEPTEMBER 10, 2013

CENTRAL CALIFORNIA IRRIGATION DISTRICT
LOS BANOS CALIFORNIA

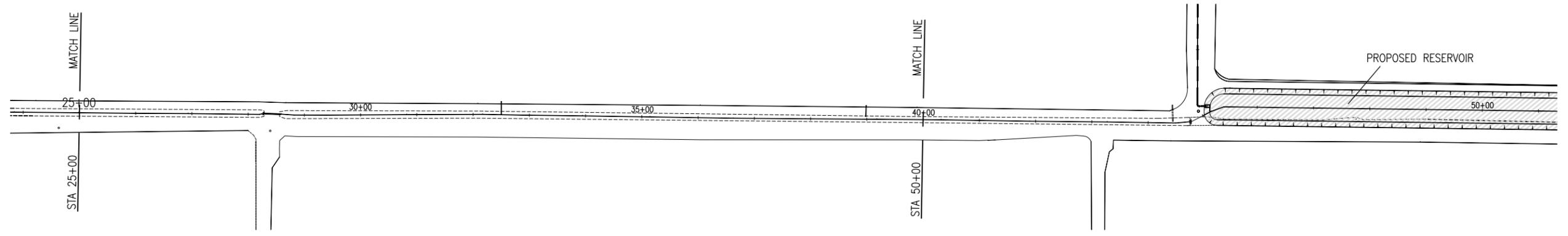
AMARAL SYSTEM IMPROVEMENTS

CANAL PLAN & PROFILE
STA. 0+00 TO STA. 25+00

SUMMERS ENGINEERING INC. HANFORD CONSULTING ENGINEERS CALIFORNIA		DATE: OCT. 2013	APPROVED: _____
		DRAWN: JCL	DRAWING NO. PP-1
NO. DATE MADE CHKD. APPD.		CHECKED: JCL	SHEET 1 OF 4
REVISIONS		DRAWING NAME: CCID13013.DWG	



PROFILE



PLAN

DISCHARGE ELEV. DATA		
NO.	STA	FIELD ELEV.
4	32+50	95.31
5	39+00	94.72
6	44+44	94.59
7	47+70	96.22±

GENERAL NOTES

1. SEE DRAWING NO. RD-PP-1 FOR APPLICABLE GENERAL NOTES.

EXPLANATION OF SYMBOLS

- ▲ CROSS SECTION LOCATION, SEE DRAWING NO. CS-1
- (E) EXISTING
- DWS DESIGN WATER SURFACE

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For Review Only
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CENTRAL CALIFORNIA IRRIGATION DISTRICT
LOS BANOS CALIFORNIA

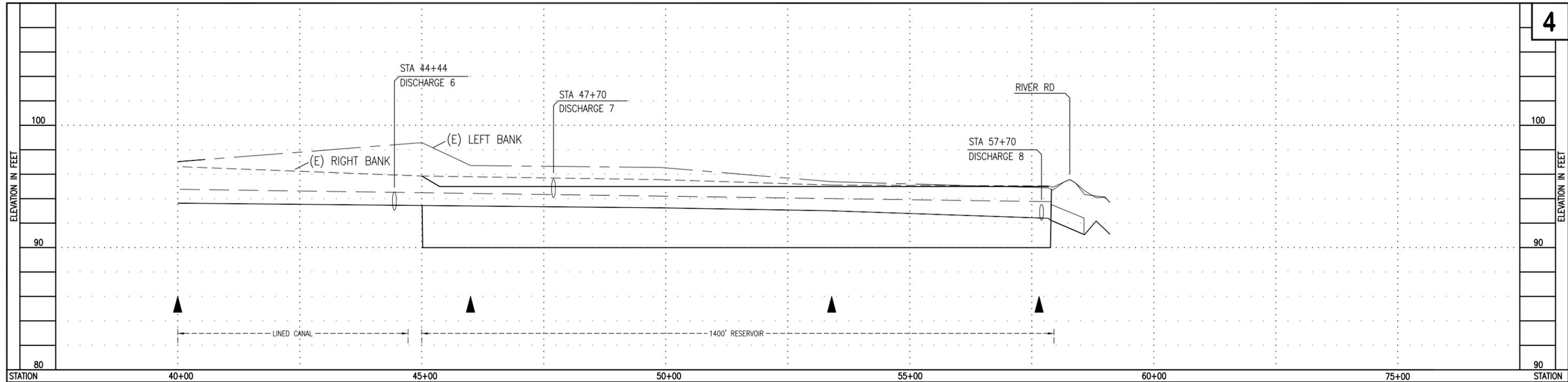
AMARAL SYSTEM IMPROVEMENTS
CANAL PLAN & PROFILE
STA. 25+00 TO STA. 50+00

SUMMERS ENGINEERING INC.
HANFORD CONSULTING ENGINEERS CALIFORNIA

NO.	DATE	MADE	CHKD.	APPD.

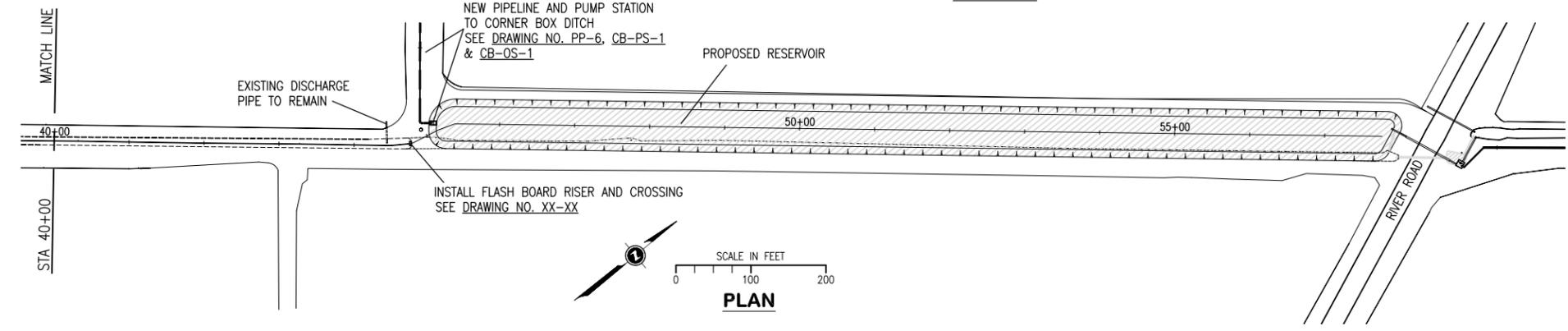
DATE: OCT. 2013	APPROVED: _____
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CHECKED: JCL	SHEET 2 OF 4

DRAWING NAME: CCID13008.DWG



STATION 40+00 45+00 50+00 55+00 60+00 75+00 STATION

PROFILE



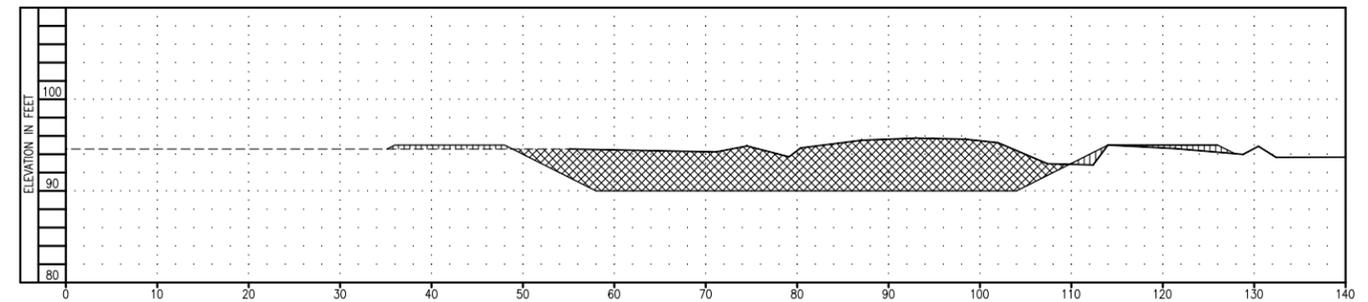
PLAN

GENERAL NOTES

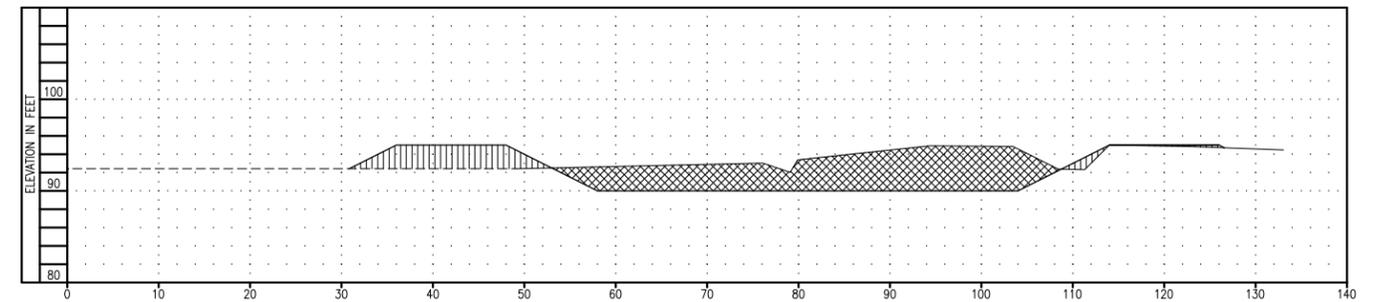
1. SEE DRAWING NO. PP-1 FOR APPLICABLE GENERAL NOTES.

EXPLANATION OF SYMBOLS

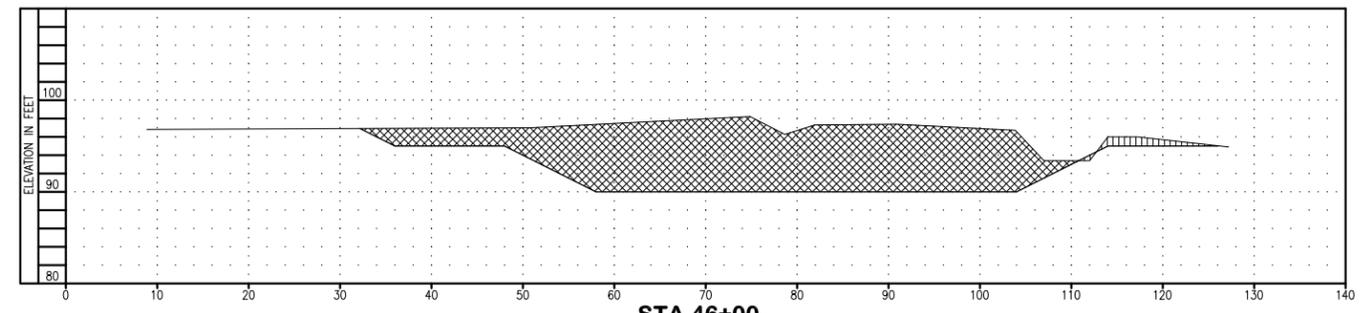
- ▲ CROSS SECTION LOCATION, SEE DRAWING NO. CS-1
- (E) EXISTING
- DWS DESIGN WATER SURFACE



STA 53+40



STA 57+65



STA 46+00

LEGEND

- EXISTING CROSS SECTION
- - - EXISTING CROSS SECTION (ASSUMED)
- PROPOSED CROSS SECTION
- ▨ FILL AREA
- ▩ CUT AREA

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For Review Only
Subject to Revision
SEPTEMBER 20, 2013

CENTRAL CALIFORNIA IRRIGATION DISTRICT
LOS BANOS CALIFORNIA

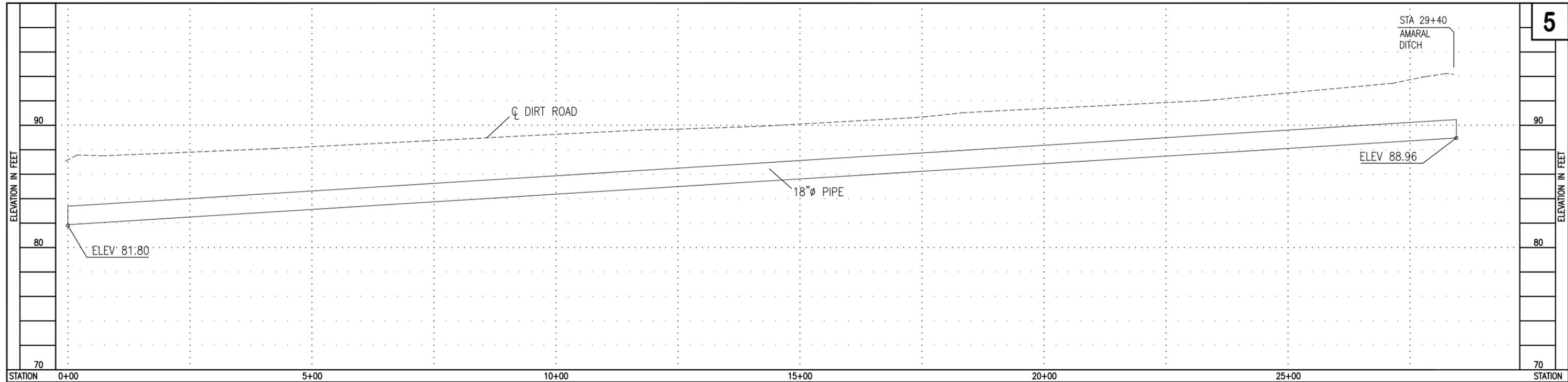
RIDGE DITCH LINING PROJECT PHASE II

CANAL PLAN & PROFILE
STA. 50+00 TO STA. 58+40

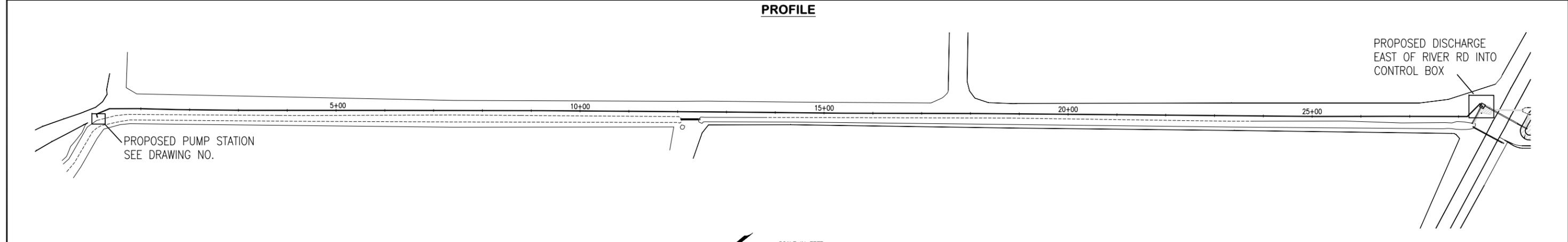
SUMMERS ENGINEERING INC.
Consulting Engineers CALIFORNIA

NO.	DATE	MADE	CHKD.	APPD.
REVISIONS				

DATE	OCT. 2013	APPROVED	
DRAWN	JCL	DRAWING NO.	PP-3
CHECKED	JCL	SHEET	3 OF 4
DRAWING NAME :		CCID13008.DWG	



PROFILE



PLAN

GENERAL NOTES

1. SEE DRAWING NO. RD-PP-1 FOR APPLICABLE GENERAL NOTES.

EXPLANATION OF SYMBOLS

- ▲ CROSS SECTION LOCATION, SEE DRAWING NO. CS-1
- (E) EXISTING
- DWS DESIGN WATER SURFACE

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Subject to Revision
SEPTEMBER 10, 2013

CENTRAL CALIFORNIA IRRIGATION DISTRICT
LOS BANOS CALIFORNIA

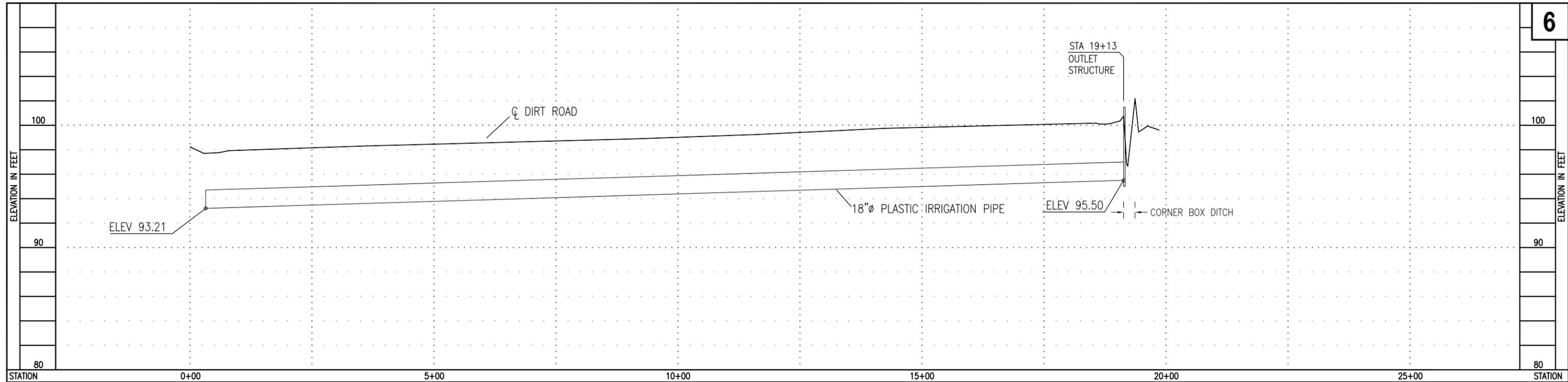
AMARAL SYSTEM IMPROVEMENTS
**RIVER PIPELINE PLAN & PROFILE
PUMP STATION LAYOUT**

SUMMERS ENGINEERING INC.
HANFORD CONSULTING ENGINEERS CALIFORNIA

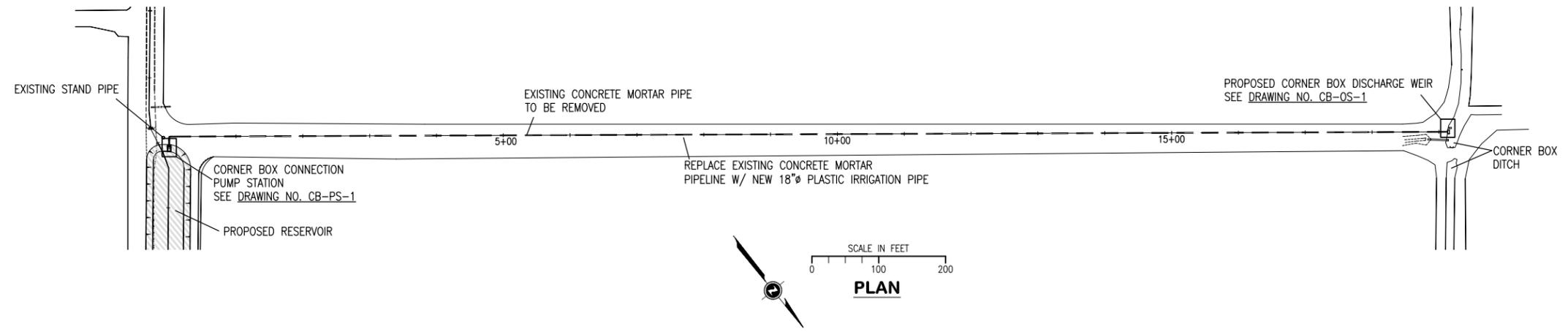
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DATE: OCT. 2013	APPROVED: _____
DRAWN: JCL	DRAWING NO. PP-4
CHECKED: JCL	SHEET 4 OF 4

DRAWING NAME: CCID13013.DWG



PROFILE



PLAN

GENERAL NOTES
 1. SEE DRAWING NO. RD-PP-1 FOR APPLICABLE GENERAL NOTES.

EXPLANATION OF SYMBOLS
 ▲ CROSS SECTION LOCATION, SEE DRAWING NO. CS-1
 (E) EXISTING
 DWS DESIGN WATER SURFACE

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 OCTOBER 08, 2013

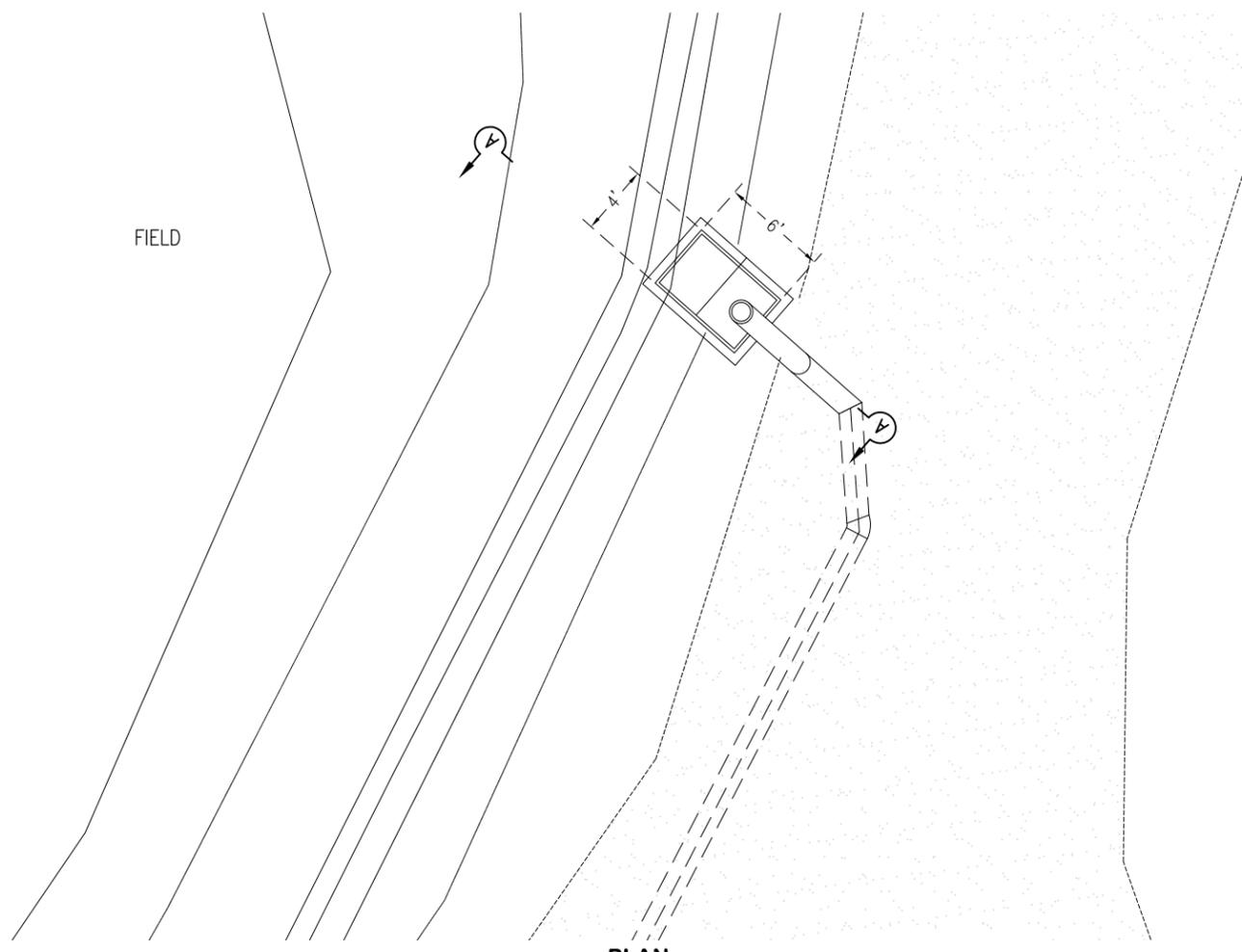
CENTRAL CALIFORNIA IRRIGATION DISTRICT
 LOS BANOS CALIFORNIA

AMARAL SYSTEM IMPROVEMENTS
CORNER BOX CONNECTION PIPELINE
PLAN AND PROFILE

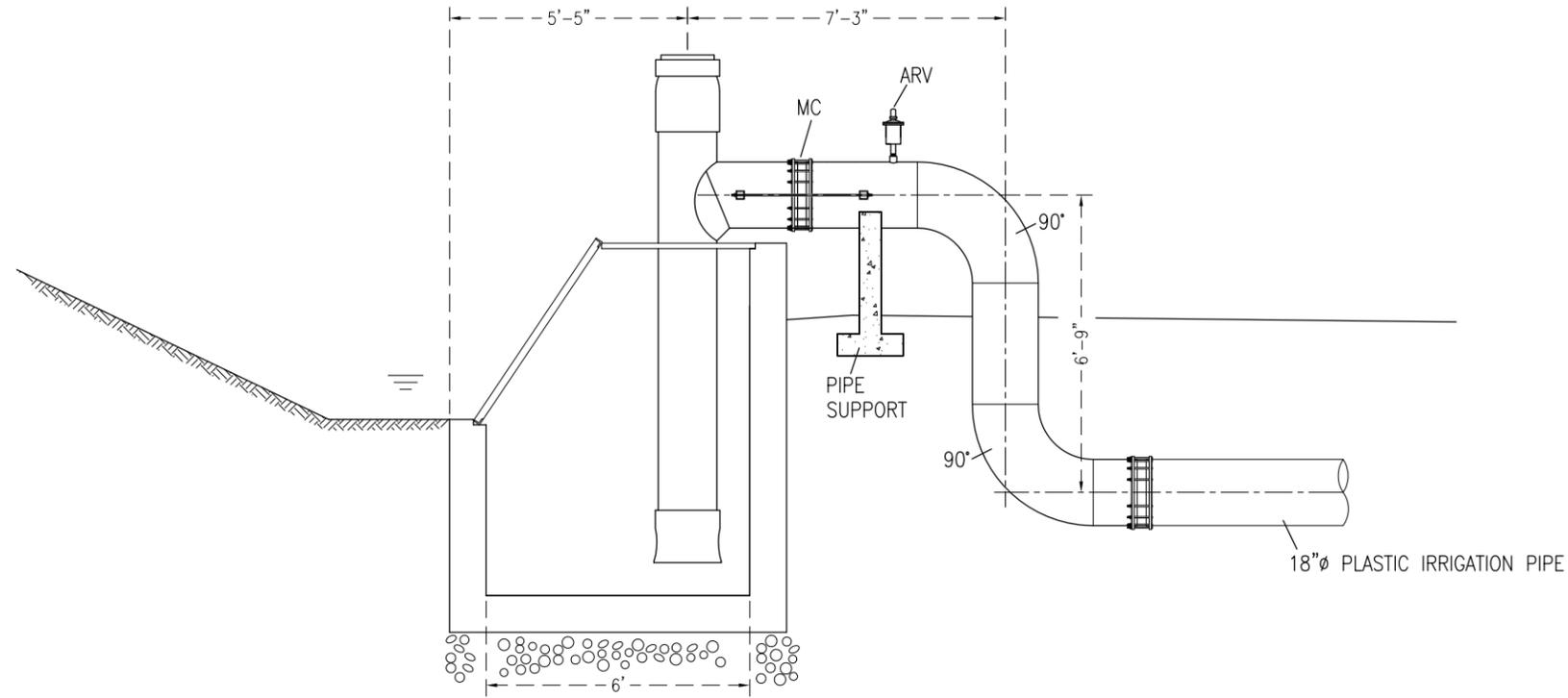
SUMMERS ENGINEERING INC. Consulting Engineers CALIFORNIA					DATE: OCT. 2013	APPROVED: _____
					DRAWN: JCL	DRAWING NO.: PP-5
REVISIONS			CHECKED: JCL	SHEET: 5 OF 5	DRAWING NAME: CCID13013.DWG	

GENERAL NOTES

- 1. SEE DRAWING NO. RD-PP-1 FOR APPLICABLE GENERAL NOTES.
- 2. XXXXXXXXXXXXXXXX
- 3. XXXXXXXXXXXXXXXX
- 4. XXXXXXXXXXXXXXXX



PLAN



SECTION A-A

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AUGUST 5, 2013

CENTRAL CALIFORNIA IRRIGATION DISTRICT
LOS BANOS CALIFORNIA

AMARAL SYSTEM IMPROVEMENTS

RIVER PUMP STATION

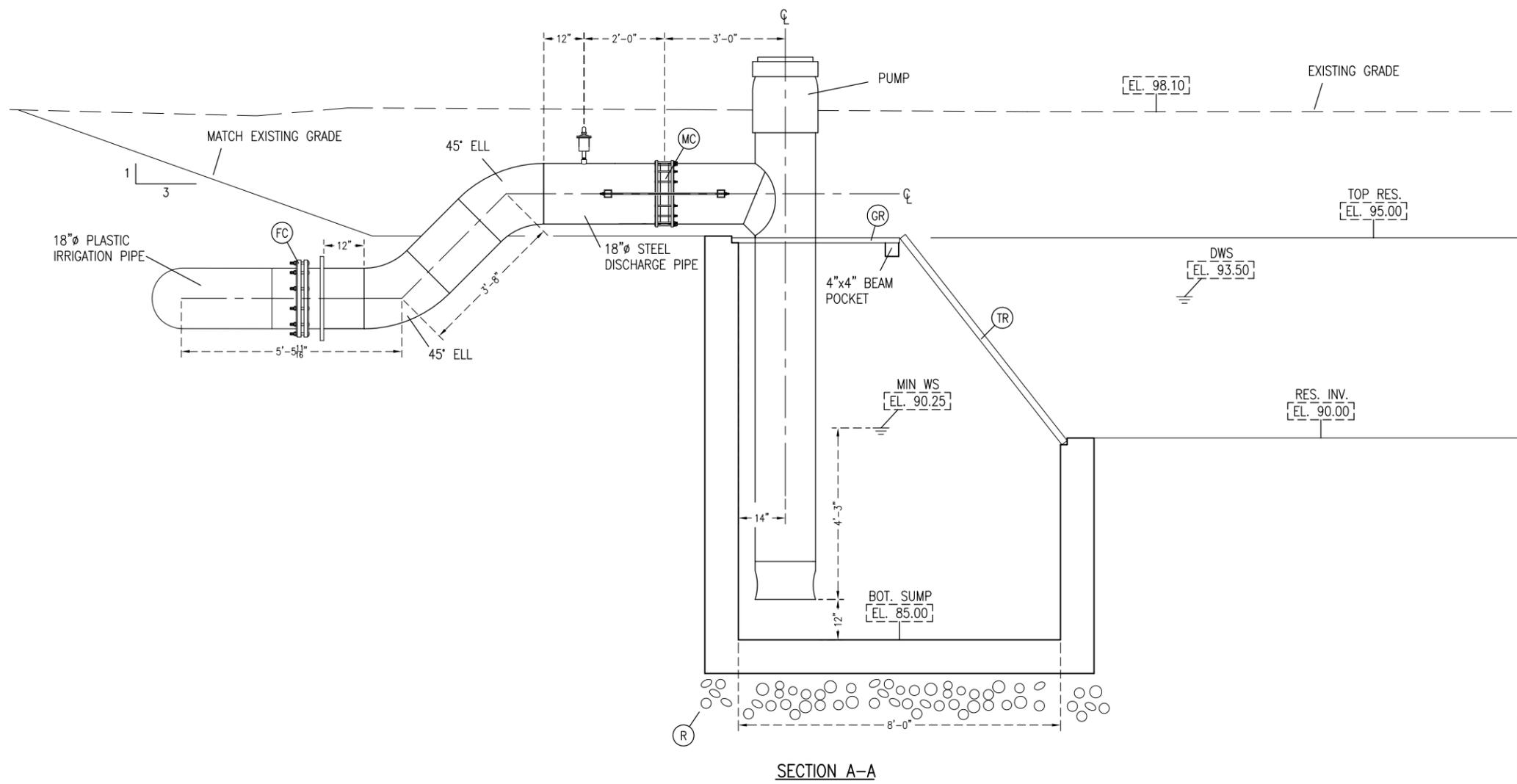
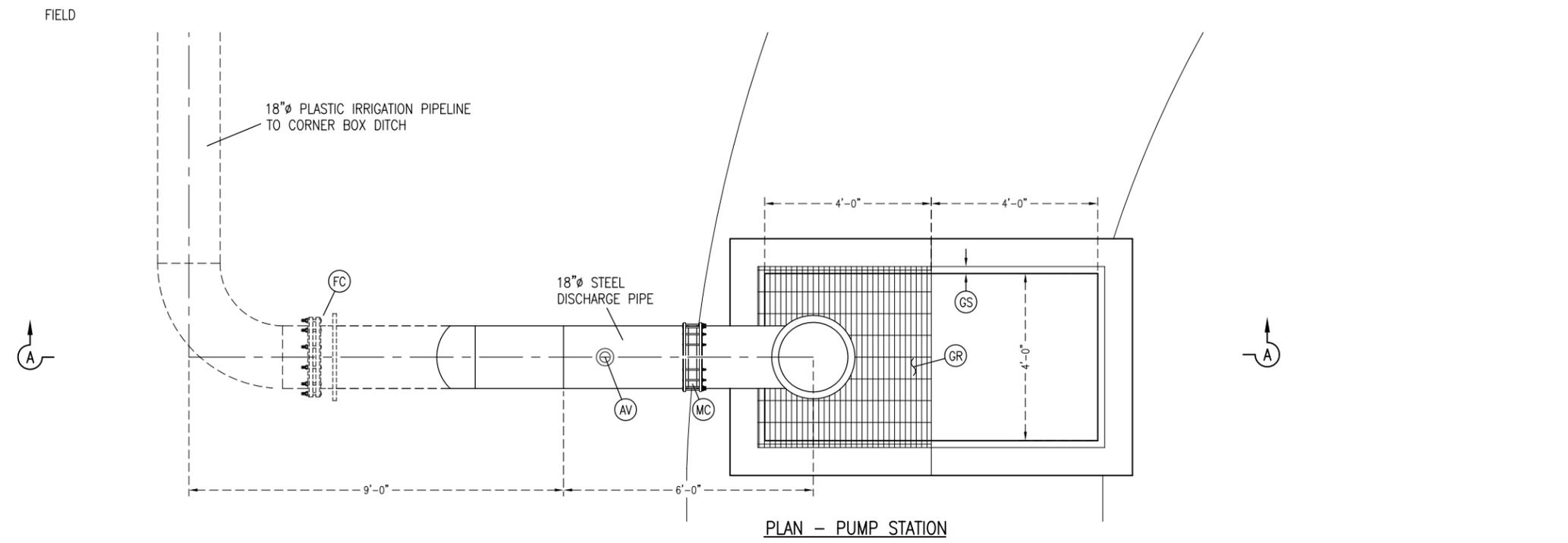
SUMMERS ENGINEERING INC.
HANFORD CONSULTING ENGINEERS CALIFORNIA

NO.	DATE	MADE	CHKD.	APPD.
REVISIONS				

DATE	OCT. 2013	APPROVED	
DRAWN	JC	DRAWING NO.	PS-1
CHECKED	JCL	SHEET	1 OF 1

DRAWING NAME : CCC13013.DWG

GENERAL NOTES
 1. PRECAST STRUCTURES SHALL BE XXXXXXXXX.



- EXPLANATION OF SYMBOLS**
- (AV) AIR RELEASE VALVE
 - (FC) FLANGE COUPLING ADAPTER
 - (GR) GRATING
 - (GS) 2"x2" GRATING SEAT
 - (MC) MECHANICAL COUPLING
 - (R) 12" THICK LAYER OF 1" CRUSHED ROCK
 - (TR) TRASH RACK, SEE DRAWING NO. XX-XX
 - (WB) 1 1/2"x6" RDWD. WEIR BOARD
 - ≡ WATER SURFACE

ESTIMATED QUANTITIES

9'x6'x2' PRECAST WEIR BOX	1 EA
10'x8'x4' PRECAST PUMP SUMP	1 EA
RIP RAP	XXX SF

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 OCTOBER 14, 2013

CENTRAL CALIFORNIA IRRIGATION DISTRICT
 DOS PALOS CALIFORNIA

AMARAL SYSTEM IMPROVEMENTS

CORNER BOX CONNECTION PUMP STATION DETAILS

SUMMERS ENGINEERING INC.
 Consulting Engineers CALIFORNIA

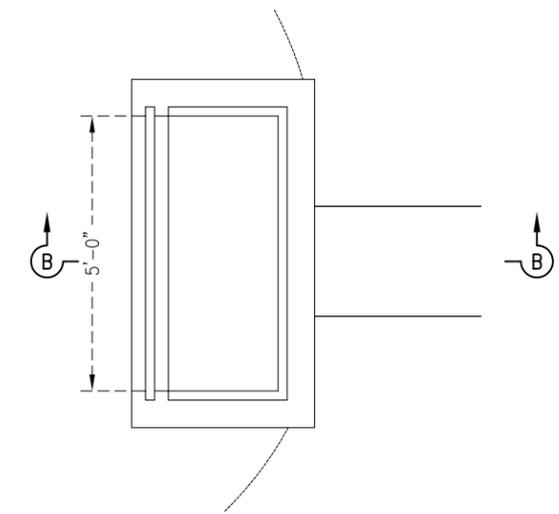
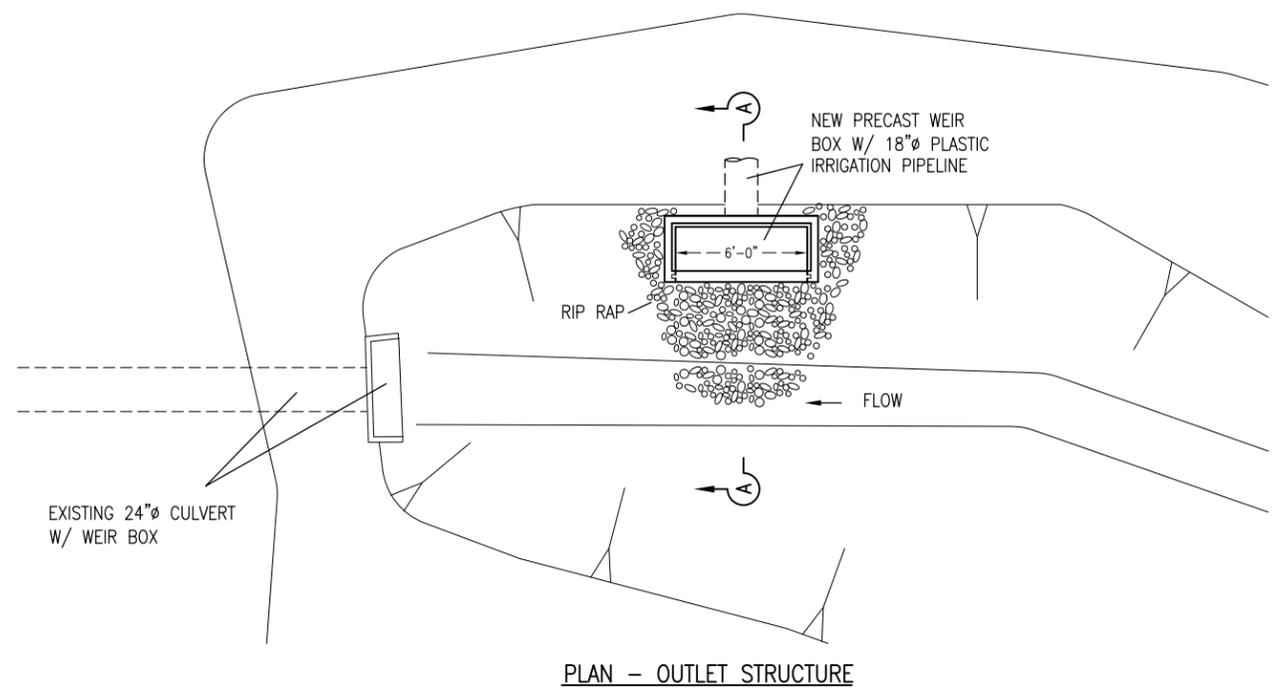
DATE	OCT. 2013	APPROVED	
DRAWN	JG	DRAWING NO.	CB-PS-1
CHECKED	JCL	SHEET	1 OF 1

DRAWING NAME : CCID13014.DWG

NO.	DATE	MADE	CHKD.	APPD.

GENERAL NOTES

- 1. PRECAST STRUCTURES SHALL BE XXXXXXXX.

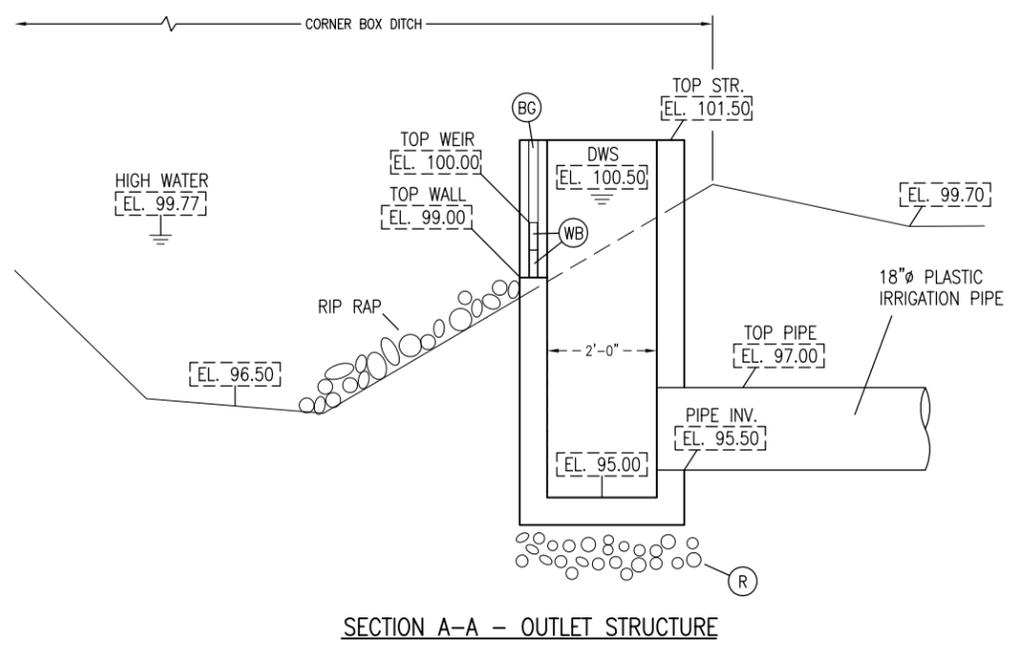
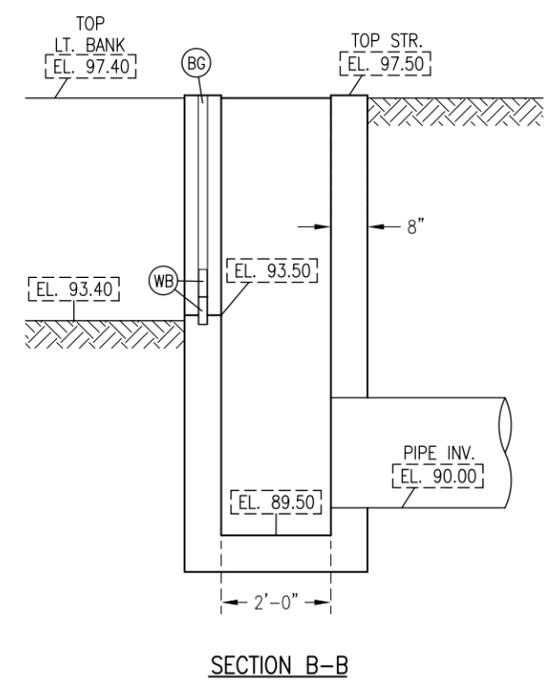


EXPLANATION OF SYMBOLS

- (BG) 2"x2" BOARD GUIDE
- (R) 12" THICK LAYER OF 1" CRUSHED ROCK
- (WB) 1 1/2"x6" RDWD. WEIR BOARD
- = WATER SURFACE

ESTIMATED QUANTITIES

9'x6'x2' PRECAST WEIR BOX	1 EA
RIP RAP	XXX SF



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OCTOBER 14, 2013

CENTRAL CALIFORNIA IRRIGATION DISTRICT
DOS PALOS CALIFORNIA

AMARAL SYSTEM IMPROVEMENTS

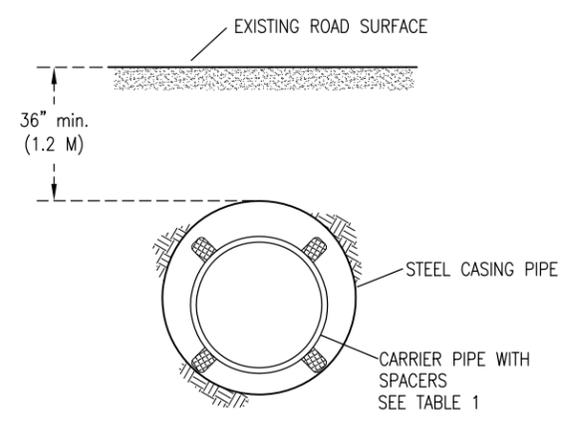
MISCELLANEOUS DETAILS

SUMMERS ENGINEERING INC.
Consulting Engineers CALIFORNIA

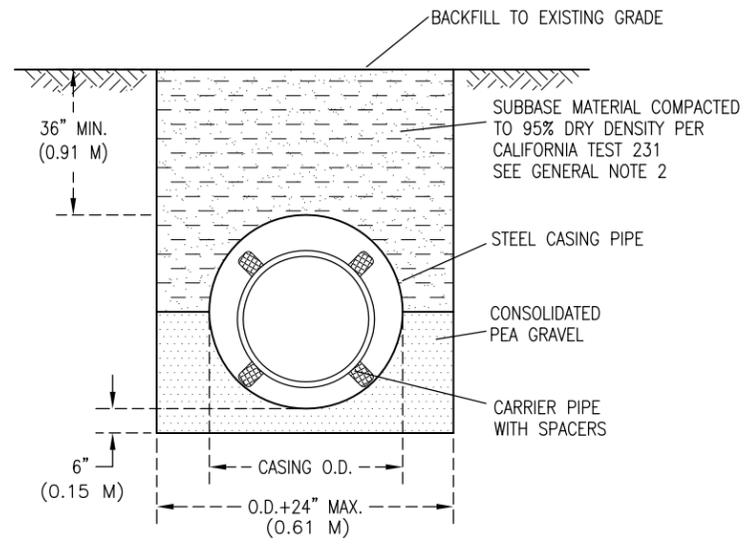
NO.	DATE	MADE	CHKD.	APPD.
REVISIONS				

DATE	OCT. 2013	APPROVED	
DRAWN	JG	DRAWING NO.	MD-1
CHECKED	JCL	SHEET	1 OF 1

DRAWING NAME : CCID13014.DWG



DETAIL A
TYPICAL JACKED PIPE SECTION

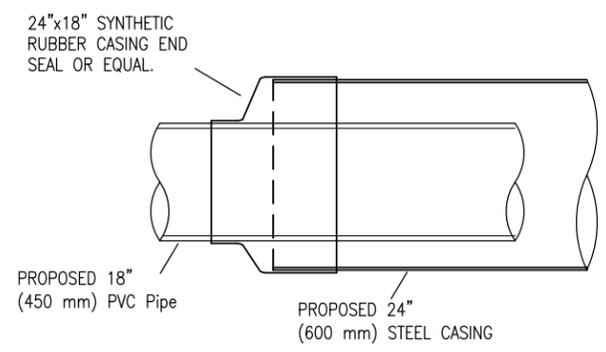


DETAIL B
TYPICAL OPEN CUT SECTION WITH CASING

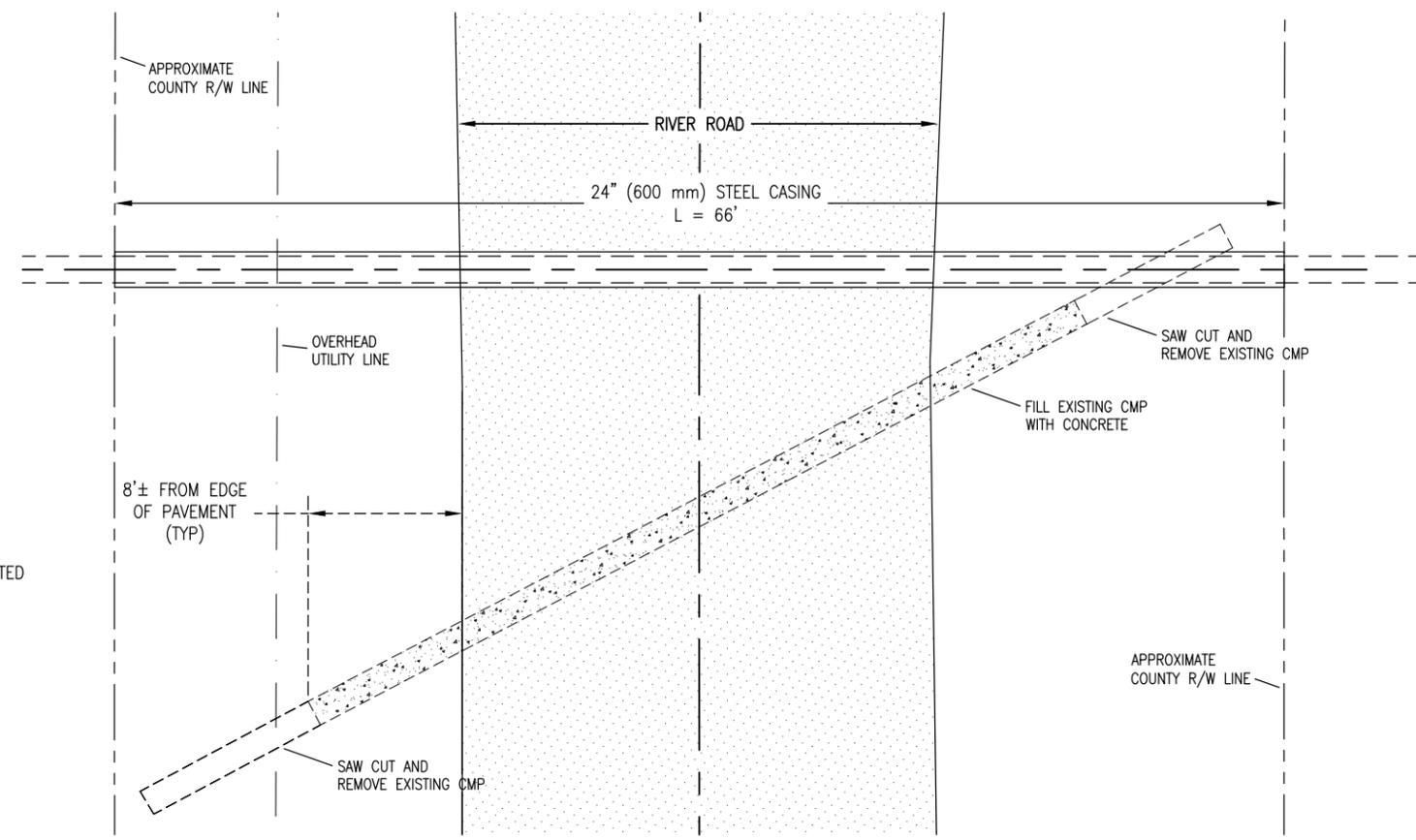
TABLE 1

PIPE DIAMETER	SPACER (SEE NOTE A)	BAND WIDTH	NUMBER OF RUNNERS
18" (450 mm)	P.S.I. RANGER II CASING SPACER	6.87" (174 mm)	4

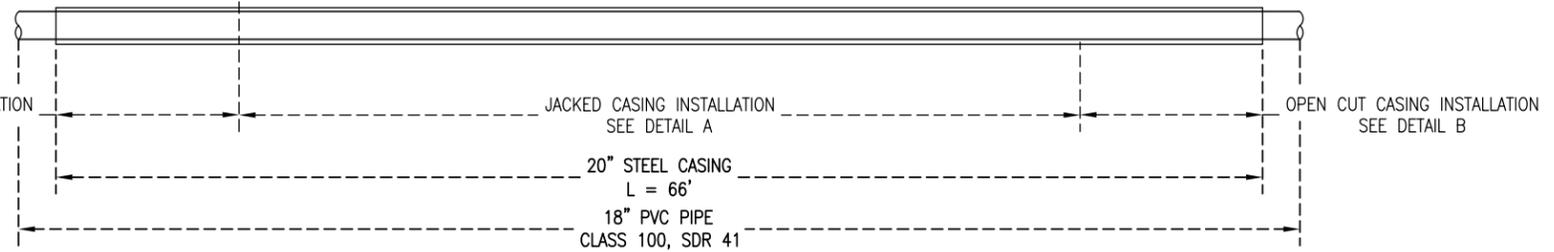
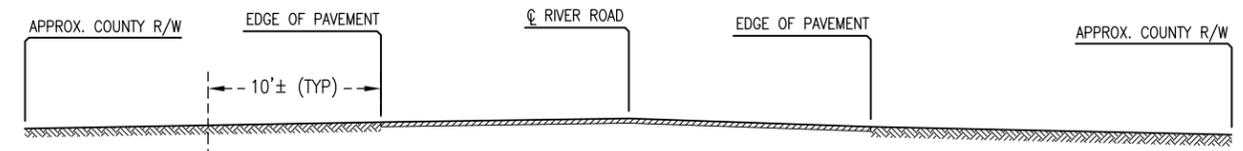
NOTE A
SPACERS TO BE LOCATED AT A MAXIMUM OF 96" (245 cm) APART ALONG THE LENGTH OF THE CARRIER PIPE WITH ONE SPACER WITHIN 12" (305 mm) FROM EACH END OF CASING AND A MAXIMUM OF 12" (305 mm) FROM EACH SIDE OF A CARRIER PIPE JOINT. THE LENGTH OF THE RUNNERS SHALL BE A MINIMUM OF 1.97" (50 mm).



DETAIL C
CASING AND SEAL



PLAN



SECTION
SCALE: HOR = VERT

GENERAL NOTES

1. STEEL CASING SHALL HAVE A MINIMUM WALL THICKNESS OF $\frac{3}{8}$ " (10 MM).
2. THE SUBBASE MATERIAL SHALL BE CLASS 2 AGGREGATE BASE AND SHALL CONFORM TO SECTION 26 OF CALTRANS STANDARD SPECIFICATIONS.
3. THE CONTRACTOR SHALL PROVIDE ALL SHEETING, SHORING, SLOPING, OR OTHER METHODS REQUIRED FOR WORKER SAFETY & PROTECTION.
4. JACKING PITS ARE TO BE LOCATED NO CLOSER THAN 10' FROM EDGE OF PAVEMENT.
5. METRIC DIMENSIONS AND STATIONS ARE SHOWN IN PARENTHESES.

EXPLANATION OF SYMBOLS AND ABBREVIATIONS

PVC	Polyvinyl Chloride
☉	Centerline
R/W	Right-of-Way
P.S.I.	Pipeline Seal and Insulator, Inc.
SR	State Route
CMP	Corrugated Metal Pipe

Call USA At Least 48 Hours Prior To Any Excavation 1-800-642-2444

Caution : Overhead Power Lines in this Area

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For Review Only
Subject to Revision
JANUARY 24, 2014

CENTRAL CALIFORNIA IRRIGATION DISTRICT
LOS BANOS CALIFORNIA

AMARAL SYSTEM IMPROVEMENTS
RIVER ROAD CANAL CROSSING

SUMMERS ENGINEERING INC.
HANFORD CONSULTING ENGINEERS CALIFORNIA

NO.	DATE	MADE	CHKD.	APPD.

DATE	JANUARY 2014	APPROVED	
DRAWN	JMC	DRAWING NO.	CC-1
CHECKED	JCL	SHEET	1 OF 1

DO NOT SCALE FROM DRAWINGS ON THIS SHEET